

REMARKS

Paragraph [0055] of the specification is amended to correct a typographical omission of the word "processor." No new matter is introduced.

Claims 75-94 are cancelled. New claims 96-113 are added that cover the subject matter the inventors claim as their invention. Claims 96-113 cover the subject matter of claims 20-74 and form a generally alternative expression of a single inventive concept. Claims 96-113 are fully supported by the specification.

The examiner objected to claims 22-24 as containing informalities, reciting limitations of "first pod data" and "second pod data," while claim 20, upon which claims 22-24 depend, recites simply "first data" and "second data." The limitations of "first pod data" and "second pod data" are not intended to refer to the more generalized "first data" and "second data" terms of claim 20. Nevertheless, to avoid any ambiguity and to make the claims easier to read and comprehend, claim 20 is amended to remove the terms "first data" and "second data."

The examiner rejected claims 20-74 under section 112 second paragraph because the limitation "designed" is unclear. Claims 20, 21, 37, 38, 43, 45-47, and 61-73 are amended to remove the limitation "designed."

The examiner rejected claims 20-21, 25, 35-36, 38-51, 53-55, and 57-59 as being anticipated by Zimmer (U.S. 5,175, 392). The "second interface coupled to said memory" limitation of claim 20 has been broadly construed by the examiner to read on the ADC and CPU in Zimmer's device. Claim 20 is thus amended to more particularly claim the subject matter that the inventors regard as their invention. Specifically, claim 20 is amended to include the limitation that the memory (28') in each sensor pod (12') is operatively coupled to a processor

(120), a sensor (126), a first telemetric communications interface (72), and a second telemetric communications interface (74).

"Telemetric," as the term is commonly defined and as used herein, refers to an apparatus for measuring a quantity, transmitting the result to a distant station, and indicating or recording the quantity measured at the distant station. Merriam-Webster Inc., Webster's Third New International Dictionary of the English Language Unabridged (2002). This amendment is fully supported by the specification. See, for example, communications converters 112, 114 of Figure 5, and col. 6 paragraph [0055] ("The communications converters 112, 114 include circuitry typically used to allow a processor to communicate serially, such as line drivers, a buffer, and a universal receiver/transmitter which converts data from a parallel to serial arrangement and vice versa."). The first and second telemetric communications interfaces allow the sensor array to communicate sensor data to distant stations in a bucket brigade manner.

Conversely, the ADC and CPU in Zimmer clearly are not telemetric communications interfaces as they are not adapted for transmitting data to a distant station. Rather, the ADC, CPU and memory of Zimmer are not capable in and of themselves of transmitting data at greater than very short distances. For example, Zimmer states, "A typical CPU can be provided by an 80188 processor." Zimmer col. 4 ll. 51-52. It is well known in the art that a microprocessor of this or a similar type is not adapted for directly transmitting data to a distant station. Zimmer does disclose one telemetric communications interface (30) operatively coupled to the memory, but Zimmer does not disclose a first and second telemetric communications interface disposed in each sensor pod in the string of sensor pods.

Claims 21-25, 27, 28, 31-33, 39, 42, and 43 are amended to use consistent “telemetric communications interface” terminology as in claim 20. In view of these amendments, claims 20-25, 27, 28, 31-33, 39, 42, and 43 are novel over Zimmer.

Claims 22-24, 26-34, 37, 52, 56, and 60-74 are rejected as unpatentable over Zimmer in view of Laborde (U.S. 6,816,082), Baliguet (U.S. 2003/0176974), Endo (U.S. 6,630,890), and/or Tubel (U.S. 5,730,219). However, as independent claim 20, upon which these claims depend, is amended to differentiate over Zimmer, these claims are now believed to be patentably distinct.

Furthermore, regarding the Laborde reference, the examiner asserts that Laborde discloses that data from sensors in a borehole is transferred from node to node in bucket brigade style, so that it would have been obvious to modify Zimmer to bucket brigade transfer of data as taught by Laborde and to store the data in the memory of each device as it is passed up to the telemetry and control module in order to limit the amount of data being sent over the bandwidth of the transmission cable at the time and also to store the data in case of a communication failure along the line as the data is being transferred. Office Action of February 3, 2006 at 11.

In response, applicant submits that the Laborde device is nearly identical to a typical prior art device as illustrated in Figure 3 of applicants’ application and does not disclose a bucket brigade mode of data transfer. Referring to Figure 4 of Laborde, each node 202, 206, 210 communicates directly from its modem directly to the surface mode 200 over cable segments 244, 242, 240 and isolation switches 306, 304 and 302. Like the analog switch 54 of Figure 3 of the present application, switches 306, 304, 302 of Laborde serve simply to connect or disconnect a given mode directly to the surface node 200. See, for example, paragraph [0017] of present application and col. 4 ll. 40-51 of Laborde. In Laborde, data is not transferred from node to node by active operation of each node, but it is merely transferred from a given node directly to the

surface node, incidentally passing along one or more conductors physically disposed through other passive nodes. Each modem 314, 312, 310 communicates directly with modem 370 of surface node 200. “Data may be acquired by the sensing devices and transferred to the downhole nodes for transmission up the communications link 21.” Laborde col 2 ll. 42-44. “The length of the link may be very long, running between thousands of feet to tens of thousands of feet.” Laborde col. 6 ll. 52-54. Nowhere does Laborde disclose or suggest that modem 314 communicates with modem 312, which in turn communicates with modem 310, which finally communicates with modem 320 at surface node 200 to transfer data from node 210 to surface node 200 in a bucket brigade fashion.

Where the references taken together fail to disclose all of the limitations in the claim, a *prima facie* case of obviousness is not shown. Laborde does not disclose a bucket-brigade style of data transfer that would suggest modification of the Zimmer device. As Laborde combined with Zimmer fails to disclose a bucket brigade communication method, the section 103 rejection is improper, notwithstanding the present amendment to claim 20.

Regarding new independent claims 96 and 113, each includes a limitation that data is transferred from one sensor pod to an adjacent device in the string in a bucket brigade transfer fashion. Clearly, Zimmer does not disclose this limitation. The data in each sensor pod is transmitted directly to the telemetry unit along a common bus in a continuous cable passing through the sensor pods, and not by passing through the memory of each sensor pod positioned in the string enroute to the telemetry unit. See, for example: Zimmer col. 7 ll. 26-28 (“This short travel distance eases the telemetry requirements from the most remote of the recording stations 15 to the [main] unit 10.”); col. 2 ll. 51-55 (“Thereafter, a telemetry unit [30] transmits from the localized memory [31] to a main memory [25] and the main memory [25], in

conjunction with a main telemetry system [24], transmits data up the logging cable for recovery at the surface.”; col. 7 l. 65 - col. 8 l. 5 (“The first set of data from the first impulse is recorded over a period of time (e.g., eight seconds) while the data is being created and is stored in the memories 31 of the M stations 15. Depending on the data transfer rate from the telemetry unit 30 up to the main unit 10, the M stations can be cleared of data in the several memories 31 so that all that data is written in the memory 25 to leave the memory units 31 cleared of data.”); and col. 11 ll. 13-21 (“wherein each of said M identical recording stations [15] includes a [sic] associated memory [31] and further including the steps of converting seismic signals at said M stations into a recordable form for the associated memory, storing signals in the associated memory [31] for a finite interval, and in specific sequence, making the telemetry transfer from the M recording station memories into the main memory [25]”). Furthermore, from the above discussion of Laborde, it is clear that Laborde also does not disclose the limitation that data is transferred from one sensor pod to an adjacent device in a bucket brigade transfer fashion.

In contrast, claims 96 and 113 require a bucket brigade transfer, where a bucket brigade transfer is clearly defined in the specification as each sensor pod transmitting data stored in the memory of said sensor pod to a memory of an adjacent device in a first direction (usually a sensor pod, but could be a repeater or, for the uppermost sensor pod, the telemetry unit), and receiving data stored in a memory of an adjacent device, in an opposite direction, if any, and storing it in the memory of the sensor pod, so that data is temporarily stored in the memory of each device up the string of sensor pods as it is passed to the telemetry and control module. Specification at paragraphs [0049] - [0050].

In summary, claims 20-74 and 96-113 remain in the application and are believed to be in condition for allowance. Allowance and passage to issue is respectfully requested.

Respectfully submitted,

Brett T. Cooke

Brett T. Cooke
Reg. No. 55,836

Andrews & Kurth L.L.P.
600 Travis, Suite 4200
Houston, Texas 77002
713/220-3813 (office)
713/238-4285 (facsimile)
Customer No. 23,444

Date: June 2, 2006